

MAZEL', Z.Ye., inzh; USKOV, A.N., inzh; YAKOBSON, A.G., inzh.

Wire-rope transportation on construction sites of the Stalingrad
Hydroelectric Power Station. Mekh.stroi. 15 no.10:7-13 O '58.
(MIRA 11:11)
(Stalingrad Hydroelectric Power Station) (Cableways)

MAZEL', Zinoviy Yevgen'yevich, kand.tekhn.nauk; USKOV, Anatoliy Pavlovich, inzh.; YAKOBSON, Andrey Genrikhovich, inzh.; PLAVINSKIY, V.I., kand.tekhn.nauk, nauchnyy red.; PETROV, G.D., inzh., nauchnyy red.; AKULOV, D.A., red.; SOKOL'SKIY, I.F., tekhn.red.

[Cableways on construction sites of the Stalingrad Hydroelectric Power Station] Kanatnye dorogi na stroitel'stve Stalingradskoi GES. Moskva, Gidroproekt, 1959. 72 p. (MIRA 13:6)
(Stalingrad Hydroelectric Power Station) (Cableways)

USKOV, A.S.

PHASE I BOOK EXPLOITATION

SOV/3907

Solodovnikov, Vladimir Viktorovich, and Arkadiy Sergeyevich Uskov

Statisticheskiy analiz ob'yektor regulirovaniya; statisticheskiye metody opredeleniya dinamicheskikh kharakteristik ob'yektor avtomaticheskogo regulirovaniya v protsesse ikh normal'noy ekspluatatsii (Statistical Analysis of Control Objects; Statistical Methods for Determining the Dynamic Characteristics of Automatic-Control Objects in the Process of Their Normal Operation) Moscow, Mashgiz, 1960. 130 p. 5,000 copies printed.

Sponsoring Agency: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut kompleksnoy avtomatizatsii.

Reviewer: G.M. Ulanov, Doctor of Technical Sciences; Ed.: G.F. Polyakov; Tech Ed.: Z.I. Chernova; Managing Ed. for Literature on Machine Building and Instrument Construction (Mashgiz): N.V. Pokrovskiy, Engineer.

PURPOSE: This book is intended for scientific workers and engineers specializing in automatic control and computer technology, and for students of these subjects.

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Statistical Analysis of Control Objects (Cont.)

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COVERAGE: The book discusses methods of studying automatic control systems during their normal operation. The usual methods of artificial perturbations are, in many cases, not applicable because of their low precision in the presence of noise and because of the disturbances of the normal path of processes in a system, which are caused by artificial perturbations. The book describes problems connected with the statistical analysis of linear and nonlinear control objects with many inputs and outputs, the presence of noise, etc. The methods presented can be used in the experimental study of production facilities and processes to automatize them by creating optimum and self-adjusting automatic control systems. No personalities are mentioned. There are 33 references: 21 Soviet, 2 French, and 10 English.

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Statistical Analysis of Control Objects (Cont.)

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AVAILABLE: Library of Congress

Card 6/6

AC/rhm/mas
7-20-60

S/621/61/000/000/012/014
D234/D303

16,6800

AUTHORS: Solodovnikov, V.V., and Uskov, A.S.

TITLE: Applying computer techniques for determining dynamical characteristics of controlled objects in the process of their normal exploitation

SOURCE: Nauchno-tekhnicheskoye obshchestvo priborostroitel'noy promyshlennosti. Primeneniye vychislitel'noy tekhniki dlya avtomatizatsii proizvodstva. Trudy soveshchaniye, provedennogo v oktyabre 1959 g. Ed. by V.V. Solodovnikov. Moscow, Mashgiz, 1961, 458 - 482

TEXT: It is supposed that 1) the objects under consideration are linear and have constant parameters, 2) the processes in the system are ergodic and stationary. Complex objects of automatic control with several inputs and outputs and feedbacks, as well as systems of many circuits in the presence of internal disturbances are considered. The author describes a statistical method of determining the dynamic characteristics of linear objects, the calculation of ✓B

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Applying computer techniques for ...

the correlation functions (formulae and methods of calculation with the aid of computers), methods of determining spectral densities, determination of dynamical characteristics in the time domain, use of a controlled filter for this purpose when the object has several inter-correlated inputs, and use of universal computers for determining dynamic characteristics in the frequency domain. It is stated that the controlled filter is the most reliable of all specialized devices for solving the equation of the correlation function in the time domain, and that on a filter designed at TsNIIKA the average time of solution is 5 min. There are 8 figures and 24 references: 17 Soviet-bloc and 7 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: Fu-Ci-Le, Determination of Linear System Characteristics by means of Spectral Functions, Automation v. II, no. 1, 1959, 31 - 36; G.C. Newton, L.A. Gould, and J.F. Kaiser, Analytical Design of Linear Feedback Controls, New York, 1957, 4, 2, 118; T.P. Goodman, and J.B. Reswick, Determination of System Characteristics from Normal Operating Records, Transaction of the ASME, no. 2, v. 78, 1956; T.P. Goodman, Determination of Multipole and Non-linear System Cha-

✓B

Card 2/3

Applying computer techniques for ...

S/621/61/000/000/012/014
D234/D303

racteristics from Normal Operating Records, Transaction of the ASME
no. 2, v. 78, 1956.

VB

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32578
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D234/D303

9,7200

AUTHORS:

Orlov, Yu.M., and Uskov, A.S.

TITLE:

A specialized computer for determining dynamic characteristics, simulation and correction of automatic control systems

SOURCE:

Nauchno-tehnicheskoye obshchestvo priborostroitel'noy promyshlennosti. Primeneniye vychislitel'noy tekhniki dlya avtomatizatsii proizvodstva. Trudy soveshchaniya, provedennogo v oktyabre 1959 g. Ed. by V.V. Solodovnikov. Moscow, Mashgiz, 1961, 503 - 517

TEXT: The authors give the technical characteristics of a controlled filter designed at TsNIIKA for calculating integrals of the type

$$y(t) = \int_0^{\infty} x(t - \theta) k(\theta) d\theta; \quad (1)$$

The filter consists of 1) a magnetic tape delay line for retaining Card 1/2

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D234/D303

A specialized computer for ...

26 values of the input signal, 2) control desk including the potentiometers for coefficient setting, summation unit and comparison unit, 3) supply unit with the voltages +350, +75, -350 and -190 v. The filter can also be used for solving integral equations of the type

$$f(x) = \int_a^b K(x - t) \varphi(t) dt, \quad (3)$$

X

in which case it contains 1) a bloc for periodical introduction of the values of functions, 2) a comparison unit (in the control bloc) 3) an electronic oscilloscope. Different uses of the filter in solving problems of automatic control are discussed in detail. There are 16 figures and 4 Soviet-bloc references.

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29258

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D274/D301

26.2, -

AUTHOR: Uskov, A. S. (Moscow)

TITLE: On determining the disturbance characteristics in the aircraft-autopilot system

PERIODICAL: Avtomatika i telemekhanika, v. 22, no. 10, 1961, 1416-1418

TEXT: A method is described for determining the mathematical expectation, the correlation function and the disturbance spectrum in the aircraft-autopilot system. This method applies to any linear process and system of automatic control. The dynamic characteristics of the aircraft and the autopilot are given, as well as certain realizations of stationary random processes at their inputs and outputs. It is required to find the equivalent disturbances--the mathematical expectation, the correlation function and the spectrum. The equivalent disturbance is defined as the sum total of the disturbances which affect the controlled variable, referred to a certain (arbitrarily selected) point of the system. The

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On determining the...

motion of the aircraft-autopilot system is considered. The linearized dynamic equations are, in the first approximation

$$(J_y p^2 + M_y^\omega p + M_y^\psi) \psi = -\varrho + N, \quad \varrho = M_y^\delta (1 + kp) \psi \quad (1)$$

where J_y is the moment of inertia of the aircraft with respect to the vertical axis, $M_y = -\varrho + N$ is the total moment, M_y^ψ is the stability

moment, M_y^ω is the damping moment, M_y^δ is the derivative of the moment with respect to the angle δ (of elevator displacement), $N(t)$ is the flight disturbance due to wind, temperature changes, etc. $N(t)$ is considered as the equivalent disturbance acting at the system input. The transfer function ϕ of the aircraft, and Φ_a of the autopilot, are assumed as known. In addition, the change in M_y is also known over a sufficient time interval $T + T'$. For the given system

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On determining the...

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$$y(t) = \int_0^\infty M_y(t-\tau) k(\tau) d\tau$$

where $k(t)$ is an impulse transient function, corresponding to $1 + \frac{i}{\omega}$.
After transformations, one obtains for the mathematical expectation E_N ,
the correlation function R_N , and the spectrum S_N :

$$EN(t) = 0 \quad (10)$$

$$R_N(\tau) = AR_{M_y}(\tau) + Ce^{i|\tau|}(F \cos \omega_1 \tau - E \sin \omega_1 |\tau|), \quad (11)$$

$$S_N(\omega) = 2C \left\{ \frac{Aa}{\omega^2 + \omega^2} - \frac{Fe(e^2 + \omega^2 + \omega_1^2) + E\omega_1'(e^2 - \omega^2 + \omega_1^2)}{[e^2 + (\omega_1 + \omega)^2][e^2 + (\omega_1 - \omega)^2]} \right\} \quad (12)$$

where A, E, a, b, F, d, f are given by expressions. A numerical example is considered. There are 1 figure and 4 Soviet-bloc references.

SUBMITTED: March 27, 1961

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S/194/62/000/006/011/232
D222/D309

A special-purpose computer for ...
of a sequence of ordinates $k(0)$, $k(T)$, $k(2T)$, ..., $k(NT)$, so that
instead of the integral we evaluate the sum

$$y(t) = T \sum_{n=0}^N k_n \cdot x(t - nT), \text{ where } k_r = k(nT).$$

With the inclusion of additional elements the VF can be used for
the solution of the Fredholm equation of the first kind with a ker-
nel of the type

$$f(x) = \int_a^b k(x - t) \cdot \varphi(t) dt.$$

The problem of determining the dynamic characteristics of regula-
ted objects leads to the solution of this equation. It is shown
that the advantage of the statistical method for the determination
of the dynamic characteristics of the regulated objects is in its
greater accuracy in the presence of noise, and in the possibility
of determining the dynamic characteristics in the process of normal

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A special-purpose computer for ...

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D222/D309

operation of the objects. It is possible to determine the dynamic characteristics of complex objects with many intercorrelated inputs and outputs, and of complex multi-loop systems in the presence of internal noise. The possibilities of using VF in the circuit of a corrector unit in the feedback loop are examined. VF can be used for the modelling of various systems, especially those having variable pass bands. The basic data on VF are given, together with a short description of its main units. 16 figures and 4 references.
[Abstractor's note: Complete translation.]

Card 3/3

USKOV, A. S.; ORLOV, Yu. M

"Design Principles and Circuit of Multichanneled Correlatograph for
a Specialized Computer."

Paper to be presented at the IFAC Congress, to be held in
Basel, Switzerland, 27 Aug to 4 Sep 63

L 12484-63

BDS

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46

AUTHOR: Uskov, A. S. and Orlov, Yu. M.

TITLE: Principles of construction and circuit of a multichannel correlograph

PERIODICAL: Avtomatyka, no. 2, 1963, 64-75

TEXT: The article describes the recently developed multichannel correlograph and its theoretical basis. This circuit has two basic advantages: a. it is multichannel, i.e. it simultaneously calculates several ordinates of the correlating function, which in turn facilitates its use in self-tuning automatic control circuits; b. the use of displacement in the circuit facilitates increased precision of calculation of correlating functions. This refers particularly to those realizations in which mathematical expectation greatly exceeds the maximum pulsation, which occurs in the majority of industrial automatic control systems. A circuit was worked out on the basis of a theoretical study of various factors which influence the accuracy of calculation of correlation functions. The upper value of the root-mean-square error was obtained for the general case. A derived formula enables the authors to select the optimum method for calculating

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Principles of construction

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correlation functions (from the standpoint of precision) as well as the schematic diagram of the correlograph. A detailed description is given of stages and elements of the multichannel correlograph and their block and schematic diagrams. The article describes a procedure for operating such a multi-channel correlograph. The article contains 9 figures and a 7 item bibliography.

SUBMITTED: October 10, 1961.

Card 2/2

L 501.85-65 EWT(d)/EWP(v)/EWP(k)/EWP(h)/EWP(l) Po-4/Pq-4/Pf-4/Pg-4/Pk-4/
PL-4 IJP(o) BC

AM5015052:

Rock Exploitation
IZVQ/5KIV/VEG.
Ageyev, V. M. (Engineer), and others [EDITORS ?]

UR/
57
43
B+1

Instrument manufacture and automatic control devices; handbook in five volumes. v. 4: Automatic control and automatic devices (Priborostroyeniye i sredstva avtomatiki; spravochnik v pyati tomakh. t. 4: Avtomaticheskoye regulirovaniye i sredstva avtomatiki). Moscow, Izd-vo "Mashinostroyeniya", 1965. 716 p. illus., biblio., index. Errata slip inserted. 24,700 copies printed.

TOPIC TAGS: automation, automatic control systems, automatic controller classification, static linearization, designing complex automation

PURPOSE AND COVERAGE: This is the fourth volume of the handbook: "Instrument manufacture and automatic control devices." It consists of two parts. Part one presents the fundamentals and definitions of the theory of automatic control, modern methods of mathematical analysis and synthesis of linear and nonlinear systems, and the methods of their dynamic computation. The second part of

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the volume contains descriptions of typical electrically, pneumatically, and hydraulically operated controllers, actuating mechanisms, and control systems. It also gives basic technical characteristics of electronic computational techniques applied in automation, and elucidates problems of the organization and planning of the most widely used systems of automatic control.

TABLE OF CONTENTS [Abridged]:

Part I. Theory and methods of designing automatic control systems

- 1. Fundamental principles, structure of systems, and a definition of the theory of automatic control (Ye. G. Invol'skiy, L. G. Novogranova, and V. V. Glukhov) -- 1-18
- 2. Objects of automatic control (Yu. Ye. Russkiy) -- 23-54
- 3. Elements of automatic controllers -- 58-132
- 4. Automatic controllers (Yu. Ye. Russkiy) -- 145-176
- 5. Methods for calculating the dynamics and the statics of SAR (system of automatic regulation), the SAC (system of automatic control) and servosystems (L. G. Negranova and V. V. Glukhov) -- 176-230

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6. Nonlinear characteristics and methods of designing SAR and servomechanisms -- 230-294
7. Static linearization (C. M. Ulanov, and K. A. Pupkov) -- 294-344
8. Variational methods and the theory of accumulative errors -- 344-361
9. Methods for experimental testing of automatic control systems -- 361-387
10. Problems of the theory of automatic control -- 387-419
11. Principles of designing systems of complex automation by

Part II. The means of automation applying control computers (A. S. Uskov) -- 419-437

12. Classification of the means of automation (M. Ye. Rakovskiy) -- 437-443
13. Electrical and electronic controllers (V. A. Bodner) -- 443-497
14. Means for automatic regulation and control of electrical drives (T. Z. Portnoy) -- 497-525
15. Electronic computer technology for automatic control and regulation (B. M. Yakubson) -- 525-575
16. Pneumatic controllers and schemes of typical pneumatic SAR (V. S. Frusenko) -- 575-618

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17. Hydraulic and electrical-hydraulic means of automation and auxiliary devices -- 618-645
18. Designing systems for control and automatic regulation (A, B, Rodey) -- 645-694

SUB CODE: IE SUBMITTED: 05Feb63 NO REF Sov: 344

OTHER: 051

me
Card 4/4

L 24338-66 EWP(k)/EWP(h)/EWT(d)/EWP(v)/EWP(1) GS

ACC NR: AT6005907

SOURCE CODE: UR/0000/65/000/000/0281/0291

AUTHOR: Uskov, A. S.; Orlov, Yu. M.

JG
BTI

ORG: None

TITLE: A multichannel correlator for the statistical processing of random processes in industrial automatic control systems

SOURCE: International Federation of Automatic Control. International Congress. 2d, Basel, 1963. Tekhnicheskiye sredstva avtomatiki (Technical means of automation); trudy kongressa. Moscow, Izd-vo Nauka, 1965, 281-291

TOPIC TAGS: automatic control system, computer control system, random process, correlation function, computer design, industrial automation

ABSTRACT: The authors develop a theory and design a correlator which, with minimum delay and tolerable degree of accuracy, reads out within specific discrete intervals of time an entire correlation function in the form of several ordinates. An evaluation is made of the theoretical error of the calculation for the general case when the random function contains the constant component, i. e., $Ex(t) \neq 0$. The method of computing in the multichannel correlator is presented in detail. The units and elements of the device are described and the operational procedures are outlined. Orig. art. has: 9 figures and 11 formulas.

SUB CODE: 09, 13 / SUBM DATE: 23Jun65 / ORIG REF: 006 / OTH REF: 002

Card 1/1 PB

2

"APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001858130006-9

GUTER, Rafaill Samoylovich; ARLAZAROV, Vladimir L'vovich; USKOV,
Anatoliy Vasil'yevich; REZNIKOVSKIY, F.P.; red.

[Programming practices; a handbook] Praktika programmiro-
vaniia; spravochnik. Moskva, Nauka, 1965. 211 p.
(MIR 18:4)

APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001858130006-9"

USKOV, B. V.

"Investigation of the Earthening of Electro-Tractor Aggregates." 17 June '52.
Dissertation for the degree of Cand. Tech. Sci. at the All-Union Inst. for the
Mechanisation and Electrification of Agriculture.

Official opponenets. were: Prof. S. A. Burguchev and Dr. Tech. Sci. Ebin, L. Ye.

USKOV, B. V. (Engr)

USKOV, B. V. (Engr) -- "Investigation of the Ground Connections of an Electric Tractor Unit." Sub 17 Jun 52, VIM and VIESKh. (Dissertation for the Degree of Candidate In Technical Sciences.)

SO: VECHERNAYA MOSKVA, January-December 1952

USHKOV, F., kand. tekhn. nauk

Heat insulating properties of standard panels of buildings in
series 1-464. Zhil. strci. no.9:8-12 '64.

(MIRA 17:12)

ZAK, S.L.; USKOV, F.M.

Control of industrial noise. Khim.volok. no.1:56-59 '61.
(K.A 14:2)

1. Gosudarstvennyj institut po proyektirovaniyu priiziativ
iskusstvennogo volokna.
(Textile factories) (Noise)

UCHOV, F.N.

Neuropharmacology of α -tocopherol. Farm. i toks. 28 no.1:60-61
Ja-F '65. (MIRA 18:12)

1. Laboratoriya farmakologii nervnoy sistemy (zav. - deystvitelevnyy chlen AMN SSSR prof. V.V.Zakusov) Instituta farmakologii i khimioterapii AMN SSSR, Moskva. Submitted May 30, 1964.

260T28

USKOV, I.

USSR/Metallurgy - Defectoscopy, Ultra- Jul 52
sonic Waves

"The Optics of the Nontransparent," A. Matveyev,
Cand Tech Sci, Laureate of Stalin Prize; I. Uskov

Tekhnika-Molodezhi, No 7, pp 9-11

Discusses method developed by Prof S. Ya. Sokolov for detection of smallest defects in metal with aid of ultrasonic waves produced by bodies with piezoelectric or magnetostrictive properties. Schematically describes ultrasonic defec-

toscope which may detect defects of any small

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size, utilizing echo resulting from reflection of ultrasonic wave from defect. Also discusses design of ultrasonic microscope.

"APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001858130006-9

LAZUKIN, N.; USKOV, I.

We have it in the Moscow coal basin. Sov.shakht. 11 no.4:27-29
(MIRA 15:3)
Ap '62.
(Moscow Basin--Coal mines and mining) (Automatic control)

APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001858130006-9"

"APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001858130006-9

USHOV, I. A.

Dissertation: "Structure and Mechanical Properties of Clay Suspensions and Pastes."
Card Chem Sci, Kiev State U, Kiev, 1954. Referativny Zhurnal--Khimiya, Moscow,
No. 28, Apr 54.

SO: SUW 284, 26 Nov 1954

APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001858130006-9"

USKOV, E. A.

Distr: 4E2c
Effect of electrolytes on the structure-mechanical properties of bentonite suspensions A. Viskov T. G. Shevchenko St. Univ. Kiev Radiotekhnika 1971 No. 1

J. J. Bikerman

APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001858130006-9"

USKOV, I.A.

USKOV, I.A.; USKOVA, Ye.T.

An electrochemical study of bentonite suspensions. Part 1: Action
of sodium hydroxide on suspensions of electrodialyzed askangel
[with summary in English]. Koll. zhur. 19 no.3:361-367 My-Je '57.
(MIRA 10:8)

1. Kiyevskiy gosudarstvenny universitet im. T.G. Shevchenko i
Ukrainskaya akademiya sel'skokhozyaystvennykh nauk.
(Sodium hydroxide) (Askangel)

(USKOV, I. A.)

USSR/Physical Chemistry - Colloid Chemistry, Dispersion Systems.

B-14

Abs Jour: Referat. Zhurnal Khimiya, No 2, 1958, 4034.

Author : I.A. Uskov.

Inst :

Title : Influence of Electrolytes on Structural-Mechanical Properties
of Bentonite Suspensions.

Orig Pub: Kolloidn. zh., 1957, 19, No 4, 511-514.

Abstract: Electrolytes, even in weak concentrations, give rise to structural formation in aqueous suspensions (S). The strength, elasticity and viscosity indices of the S structure increase several tens of times during the first days after the addition of electrolytes. Later these indices do not increase so rapidly, but they continue to change even after a month's time. Ca and Na sulfates in weak concentrations give rise to a sharp increase of the structural-mechanical constants of S at the expense of the coagulation structure forma-

-1-

Card : 1/2

USSR/Physical Chemistry - Colloid Chemistry, Dispersion Systems.

B-14

Abs Jour: Referat. Zhurnal Khimiya, No 2, 1958, 4034.

tion. The concentrations necessary to attain the structure formation of the same degree are determined qualitatively in accordance with Schulze-Hardy rule. Na and Ca sulfates are stronger coagulation structure producers than the corresponding chlorides.

Card : 2/2

-2-

SOV-69-58-4-14/18

Electrochemical Study of Bentonite Suspensions. 2. The Action of Sodium Hydroxide with Time on Suspensions of Electrodialyzed Ascangel

values, a second inflection is observed. In Figure 2, the point of neutralization corresponds to 855 μ eq/g. All curves of potentiometric titration are characterized by a strong increase of pH on addition of small quantities of alkali. In the middle parts of the curves a slow increase is observed. The point of equivalence is clearly marked at pH 8.2-8.4. Figure 3 shows that there is no noticeable influence of the CO_2 in the air on the pH value of the suspension. The Al-ions in the disperse medium at equilibrium are considerably hydrolyzed and ensure the acidity of the suspension. The second inflection in the potentiometric curve is connected with the solution of aluminum hydroxide which is transformed into aluminate. This inflection appears after one day and becomes marked after a week. The experiments have shown that the neutralization of electrodialyzed bentonite by alkali takes place slowly. Figure 4 shows the change of the absorbed quantity of sodium hydroxide with time corresponding to the point of equivalence on the first inflection of the potentiometric titration curve. The conductimetric titration confirms the presence of ion-exchange aluminum in electro-

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NOV-69-48-4-14/18

Electrochemical Study of Bentonite Suspensions. 2. The Action of Sodium Hydroxide with Time on Suspensions of Electrodialyzed Ascangel

dialyzed bentonite.

There are 4 diagrams and 15 references, 5 of which are Soviet, 6 English, 3 American, and 1 German.

ASSOCIATIONS: Kiyevskiy gosudarstvenny universitet im. T.G. Shevchenko
(Kiev State University imeni T.G. Shevchenko)
Ukrainskaya akademiya sel'skokhozyaystvennykh nauk
(Ukrainian Academy of Agricultural Sciences)

SUBMITTED: April 7, 1957

1. Clays--Chemical reactions

Card 3/3

5(

SOV/69-21-2-18/22

AUTHORS: Uskov, I.A. and Uskova, Ye.T.

TITLE: The Electrochemical Study of Bentonite Suspensions (Elektrokhimicheskoye izuchenie bentonitovykh suspenziy).
3. Potentiometric and Conductometric Titration of an Electrically Dialyzed Ascangel With Hydrooxides of Alkali Metals (3. Potentsiometricheskoye i konduktometricheskoye titrovaniye suspenzii elektrodializovannogo askangelya gidrookisymi shchelochnymi metallov)

PERIODICAL: Kolloidnyy zhurnal, 1959, Nr 2, pp 231-237 (USSR)

ABSTRACT: The experiments were suggested by the circumstance that the problems of fixation and localization of cations in the lattice of silicates of aluminium are still objects of discussion. There is no generally accepted opinion, for instance, concerning the cation absorbing qualities of clays. Problems of this kind however, connected with the clayish minerals of the montmorillonite group, which have a great absorbency and a number of special qualities resulting from their extensible lattice, are of special

Card 1/4

SOV/69-21-2-18/22

The Electrochemical Study of Bentonite Suspensions. 3. Potentiometric and Conductometric Titration of an Electrically Dialyzed Asokangeli With Hydroxides of Alkalai Metals.

interest and give hope of new results. The authors carried out the titration of a suspension of an electrically-dialyzed asokangeli with hydroxides of lithium, sodium, potassium, rubidium and cesium and came to the following conclusions: 1) the potentiometric curves obtained at once at the adding of sodium, potassium, rubidium and cesium hydroxides are characterized by one inflection at pH 8-8.5. In the case of lithium hydroxide, the curve has a second inflection at pH 10.4. After 24 hours this inflection shows itself on all curves; 2) in the course of time the point of the first inflection is displaced to the side of the large quantities of absorbed bases in dependence on the nature of the cation; 3) the relative change in the electric conductivity of the suspension at the addition of hydroxides has been calculated according to the inclination of the initial section of the conductometric titration curves. In the course of time this inclination

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SOV/69-21-2-18/22

The Electrochemical Study of Bentonite Suspensions. 3. Potentiometric and Conductometric Titration of an Electrically Dialyzed Ascangel With Hydrooxides of Alkali Metals.

decreases for lithium, cesium and rubidium bentonites. Its various values determine the dissociation degree of the differently substituted bentonites; Li-bentonite dissociates most, Na-bentonite a little more weakly and K- Rb- and Cs-bentonites dissociate to a considerably lesser degree; 5) the measures of the ions in a non-hydrated state and their polarizability are of importance during the process of penetration to the exchange sites of the montmorillonite lattice; 6) an equal absorbency of bentonite for all cations to be determined potentiometrically may exist, provided equilibrium is attained in the system. There are 3 graphs and 11 references, 6 of which are German and 5 Soviet.

ASSOCIATION: Kiyevskiy universitet im. T.G. Shevchenko (The Kiyev University imeni T.G. Shevchenko) Ukrainskaya akademiya sel'skokhozyaystvennykh nauk (The Ukrainian Academy of Agricultural Sciences)

Card 3/4

SOV/69-21-2-18/22

The Electrochemical Study of Bentonite Suspensions. 3. Potentiometric and Conductometric Titration of an Electrically Dialyzed Assagel With Hydrooxides of Alkali Metals.

SUBMITTED: April 27, 1957

Card 4/4

15(6)
AUTHOR:

Uskov, I. A.

SOV/72-59-3-9/19

TITLE:

Determination of Plasticity in Clayey Materials (Opredeleniye
plastichnosti glinistykh materialov)

PERIODICAL:

Steklo i keramika, 1959, Nr 3, pp 26 - 30 (USSR)

ABSTRACT:

The determination methods for plasticity employed at present do not correspond to the present level of rheology, as is stated in the papers by P. A. Rebinder (Ref 1), who describes the shearing strength limit as being the most important rheologic characteristic of plastic systems. The author of the present paper tries to determine the dependence between the shearing strength limit and the humidity of clayey pastes. Table 1 shows the chemical composition of the clay types investigated. The Chasov-yarskiy clay Nr 5 has been tested by the Gedroits method (Ref 1). The sedimento-metric analysis of the clay prepares has been carried out by means of the Figurovskiy-scales (Ref 3) and the production of suspension according to the Tsurinov-Kvirikashvili method (Ref 4). Analysis results are shown in table 2. The shearing strength limit P_m was calculated according to formula

Card 1/2

Determination of Plasticity in Clayey Materials

SOV/72-55-3-9/19

$P_m = K = \frac{G}{h^2}$, where G is the load in g, h is the diving depth of the cone in cm and K is the constant. Measurements were carried out by means of the conic "plastometer" (Fig 1, measurements by the "plastometer", 2 and 3). On the basis of the values mentioned, the dependence of the shearing strength limit P_m and the paste concentration C may be represented by the equation

$\lg P_m = \frac{1}{b} \lg C - a$, where a and b are constants. The values calculated of the constants are specified in table 3. Also the determination results on plasticity according to the Atterberg method are given for comparison purposes (see A. P. Zemyatchenskiy, Ref 5). Figure 4 shows the values a as functions of the content of particles lower than 3.5μ in the prepares. The knowledge of the constants allows the deduction of the plastic properties of clayey materials (Table 4). This determination method is distinguished by the absence of the influence of subjective factors. There are 4 figures, 4 tables and 5 Soviet references.

Card 2/2

USKOV, L.A.; ZHIGOTSKIY, A.G.

Heat resistant electric insulating films from bentonite. Bent.
gliny Ukr. no.3:163-167 '59. (MIRA 12:12)

1. Kiyevskiy gosudarstvennyy universitet.
(Electric insulators and insulation)
(Bentonite)

5(4)

SOV/69-21-4-19/22

AUTHOR: Uskov, I.A. and Uskova, Ye.T.

TITLE: Electrochemical Studies of Bentonite Suspensions
4. Potentiometric Titration of Various Acid Forms of
Ascangel

PERIODICAL: Kolloidnyy zhurnal, 1959, Vol XXI, Nr 4, pp 492-498
(USSR)

ABSTRACT: The authors have carried out the potentiometric titration of acid forms of ascangel, which were obtained by 1) treatment of the bentonite with concentrated mineral acid followed by a quick washing off of excess acid, and 2) passing the mineral through an H-resin filled column. The article is divided into three sections: 1) the effect of the concentration of the suspension on the character of the titration curves of electro-dialyzed ascangel; 2) an investigation of H-ascangel; 3) an investigation of columnated ascangel suspensions. Graph 1 (section 1) shows the results of the titration of suspension. In dependence on the increase of the concentration of the sus-

Card 1/5

307/69-21-4-13/22

Electrochemical Studies of Bentonite Suspensions. 4. Potentiometric Titration of Various Acid Forms of Ascangel

pension, a lowering of the initial and a rise of the last section of the potentiometric titration curves can be observed. All curves are characterized by one point of inflection in the weak-alkaline pH region. The position of this point depends on the concentration of the suspension. With increasing concentration it shifts to the region of smaller amounts of bound sodium hydroxide. This shift cannot be explained as an electrochemical phenomenon. Here the colloid-chemical properties of the suspensions play a decisive role. The phenomenon is due to the interaction of the alkali with the active ions on the surface of the particles as well as with colloid aluminum hydroxide. As a result, the amount of absorbed base increases in dependence on a diminution of the concentration of the suspension. For 0.5-3% concentrations, this magnitude practically remains constant. The authors conclude that a comparison between potentiometric curves can be carried out within the limits of certain concentrations, particularly from 0.5 to 3%. The results of the investigation as described in sections 2 and 3 can be summarized as

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SOV/69-21-4-19/22

Electrochemical Studies of Bentonite Suspensions.4. Potentiometric Titration of Various Acid Forms of Ascangel

follows. In contrast to electrodialyzed bentonite, which appears as Al-H-bentonite, the cation exchange capacity of H-bentonite at the titration with various alkalis has one and the same value. The real maximum cation exchange capacity of bentonite can be determined by potentiometric titration of a diluted (0,5-1%) H-bentonite suspension with a strong base. The columnation of natural ascangel through H-resin results in the formation of an acid form of bentonite, in which the acidity is caused partly by H and partly by Al exchange ions. The insufficient replacement of exchange cations by hydrogen finds its explanation in the small exchange capacity of the cationite and its comparatively low activity. The potentiometric titration of electrodialyzed ascangel columnated through H-resin bears witness to the presence of a considerable amount of adsorbed H-ions in the suspension. Columnation of electrodialyzed ascangel through Al-resin results in the formation of Al-bentonite, which

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SOV/69-21-4-19/22

Electrochemical Studies of Bentonite Suspensions. 4. Potentiometric Titration of Various Acid Forms of Ascangel

coagulates on the surface of cationite grains and chokes the column. A comparison of the results of columnation of the suspension of electrodialyzed bentonite through H- and Al-resins confirms that its acidity is caused by the simultaneous presence of adsorbed H- and Al- ions. With increase in the concentration of suspensions of electrodialyzed ascangel, the jump of the potential on potentiometric curves in the region of saturation becomes more distinct. At the same time the amount (referred to 1 g bentonite) of base neutralized by the bentonite, first sharply decreases, but subsequently remains practically constant within a large interval of concentrations. The determination of the cation exchange capacity by the point of inflection on the curves of potentiometric titration will be preferably carried out on H-bentonite suspension, whose concentration lies within certain limits (0.5-2% for ascangel). The article was de-

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COV/69-21-4-19/22

Electrochemical Studies of Bentonite Suspensions. 4. Potentiometric Titration of Various Acid Forms of Ascangel

livered as a report at the 4th All-Union Conference of Colloid Chemistry in Tbilisi in 1958. There are 5 graphs and 8 references, 4 of which are Soviet and 4 American.

ASSOCIATION: Kiyevskiy universitet imeni T.G. Shevchenko (Kiyev University imeni T.G. Shevchenko) Ukrainskaya akademiya sel'skokhozyaystvennykh nauk (Ukrainian Academy of Agricultural Sciences)

SUBMITTED: 4 March, 1958

Card 5/5

81601

S/190/60/002/02/03/011
B004/B061

5.3830

AUTHOR:

Uskov, I. A.

TITLE:

Filled Polymers. I. The Filling of Polymethylmethacrylate
With Aminated Bentonite Added Directly to the MonomerPERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 2,
pp. 200-204

TEXT: The aim of this work was the synthesis of a polymer with improved thermomechanical properties by filling it with a highly disperse filling material. The author used bentonite from the Fyzhevo deposit (Khmel'nitskaya oblast', UkrSSR), an almost pure calcium montmorillonite. This was converted into the sodium form, and aminated at 70°C with octadecylene amide hydrochloride. It was then homogenized in a 1 : 9 mixture of methanol and toluene. The bentonite suspension in methylmethacrylate was polymerized at 80°C after the addition of benzoyl peroxide. The polymer samples obtained were tested for hardness with a TW(TP) hardness gauge. Fig. 1 shows the results. An addition of 9% of

Card 1/2

81604

Filled Polymers. I. The Filling of
Polymethylmethacrylate With Aminated
Bentonite Added Directly to the Monomer

S/190/60/002/02/03/011
B004/B061

bentonite raises their hardness by 16%. The maximum increase in hardness, calculated according to Shtykhnov (given by N. A. Figurovskiy in Ref. 7), is 23%. The determination of molecular weight (390,000 to 410,000) carried out after dissolution in benzene and removal of the filling material showed that the filling material had no effect on the polymerization. The thermomechanical test on Kargin's dynamometric balance, using an ИЗБ-1 (IZV-1) optical instrument for measuring lengths, showed that the vitrification temperature of the filled polymer was 2 - 3°C higher, and the flow temperature 15°C higher than that of the unfilled polymer (Fig. 2). A. G. Demidenko collaborated in the experiments. The author thanks G. V. Vinogradov for his advice. There are 2 figures and 12 references: 9 Soviet and 3 US.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko
(Kiyev State University imeni T. G. Shevchenko)

SUBMITTED: June 9, 1959

Card 2/2

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83821

15.8105 also 2209

S/190/60/002/005/011/015
B004/B067

11.2217

AUTHORS:

Uskov, I. A., Kusnitsyna, T. A.

TITLE:

Filled Polymers. II. The Effect of Dispersing Aminated Bentonite in a Monomer Medium on the Reinforcement of Polymethylmethacrylate

✓

PERIODICAL:

Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 5.
pp. 728-730

TEXT: The authors wanted to obtain a filled polymethylmethacrylate with better properties than had those obtained in a previous work (Ref. 1), by maximum dispersion of bentonite into primary particles. Octadecyl-ammonium bentonite, whose production was described in Ref. 1, was mixed with methylmethacrylate containing 0.1% benzoyl peroxide, in a ratio of 1 : 4. The mixture was crushed in a vibration mill at 47 c/sec for 80 minutes, then cooled with solid carbonic acid, and polymerized in sealed ampoules at 80°C for eight hours. The monomer which did not enter into reaction was extracted by means of benzene, the polymer was washed with methanol, dried, and pressed into tablets. With these tablets the thermo-mechanical curves were taken (Fig.) on a dynamometric balance by V. A.

Card 1/2

83821

Filled Polymers. II. The Effect of Dispersing
Aminated Bentonite in a Monomer Medium on the
Reinforcement of Polymethylmethacrylate

S/190/60/002/005/011/015
B004/B067

Kargin (Ref. 2). As compared with the product described in Ref. 1, the new product shows the following properties: flow limit above 255°C, i.e., by at least 60°C higher than that of pure polymethylmethacrylate, and by at least 40°C higher than that of the product of Ref. 1. Its strength was 47% higher than that of pure polymethylmethacrylate (Ref. 1 only 19%). The crushing did not influence the molecular weight which amounted to 360,000. Special experiments showed that on dispersion no grafting effect as described by V. A. Kargin and N. A. Plate (Ref. 3) occurred. The authors thank V. A. Kargin for a discussion. There are 1 figure and 6 references: 4 Soviet and 2 US.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko
(Kiyev State University imeni T. G. Shevchenko)

SUBMITTED: January 25, 1960

Card 2/2

83705

S/190/60/002/006/010/012
B015/B064

15-8210 17.4312

11.2217

AUTHOR:

Uskov, I. A.

TITLE:

Filled Polymers III. Polymerization of Methyl Methacrylate
During the Dispersion of Sodium BentonitePERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 6.
pp. 926-930

TEXT: The formation of polymers on Na bentonite dispersed in methyl methacrylate was investigated with and without addition of benzoyl peroxide. Kusnitsyna and Tarasenko took part in the present investigations. The highly disperse bentonite consisted almost exclusively of montmorillonite and was prepared by a method developed by the author (Ref. 3) from the mineral of the Pyzhevskiy deposit of the Khmel'nitskaya oblast' of the UkrSSR. The air-dried bentonite (granulation 2-4 mm) was dispersed in methyl methacrylate with a vibration mill of the system developed by M. I. Aronov (Ref. 4). The experimental results obtained showed an especially interesting phenomenon, i.e. the dispersed Na bentonite multiply accelerates the polymerization of methyl methacrylate initiated by

Card 1/3

Filled Polymers. III. Polymerization of Methyl
Methacrylate During the Dispersion of Sodium
Bentonite

83755
S/190/60/002/006/010/012
BO15/B064

benzoyl peroxide. The present paper investigates the influence of the Na bentonite content in methyl methacrylate with 0.1% benzoyl peroxide upon the polymer formation in a vibration crushing of 30 minutes duration. The results obtained (Table, Fig.) show that small amounts of bentonite suppress the polymerization effect, the optimum amount of bentonite however, (1.6 g/12 ml solution) causes a ten-fold increase in the polymer yield (2.65 g), and higher amounts of bentonite suppress polymerization. Special experiments showed that without benzoyl peroxide grafting of the polymer to the surface of the bentonite particle takes place (22% of the weight of bentonite) and, that no formation of the homopolymer occurs. The homopolymer formed in the presence of benzoyl peroxide has a molecular weight of 160000-180000, whereas without Na bentonite a polymer is formed with a molecular weight of 360000-390000 (Ref. 3). The fact that a graft polymer can be produced on the surface of the filler (Na bentonite) means that bentonite can be used as an active filler for polymeric materials. V. A. Kargin and N. A. Plate are mentioned in the text. There are 1 figure, 1 table, and 9 references: 8 Soviet and 1 US.

Card 2/3

Filled Polymers. III. Polymerization of Methyl
Methacrylate During the Dispersion of Sodium
Bentonite

83705
S/190/60/002/006/010/012
B015/B064

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko
(Kiyev State University imeni T. G. Shevchenko)

SUBMITTED: February 26, 1960

✓

Card 3/3

88725

15.8340

S/190/61/003/001/005/020
B119/B216

AUTHORS: Uskov, I. A., Tarasenko, Yu. G., Kusnitsyna, T. A.

TITLE: Filled polymers. IV. Combination of dissolved polymethyl methacrylate with fillers

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 1, 1961, 37-40

TEXT: In previous publications (Refs. 1,2) the authors were able to show that grinding has no influence on the addition mechanism of the polymer to the filler during the polymerization of methyl methacrylate in presence of organophilic fillers, carried out in a vibrating mill to attain homogeneous distribution. Assuming the reinforcing effect of active fillers to be attainable also by combining the latter with the ready-made polymer in an appropriate manner, the authors studied the possibility of homogeneous combination of the two components in solution. Polymethyl methacrylate (PMM) was used as polymeric component. Chalk (inert), octadecylammonium bentonite prepared according to Ref. 2 and methyl-methacrylate treated sodium bentonite which had adsorbed up to 20%

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88725

Filled polymers. IV. Combination of...

S/190/61/003/001/005/020
B119/B216

of methyl methacrylate, respectively, were used as fillers. Suspensions of the respective filler in benzene were added to benzene solutions of the polymer, mixed, and the mixture precipitated with methanol. In all cases, the powdery filled polymer obtained was completely homogeneous. The polymer properties were tested by differential thermal analysis, hardness determinations and tests of deformation under heat. Differential thermal analysis showed the filled polymer to possess higher heat stability than the unfilled polymer (octadecylammonium-bentonite filled polymer decomposes at 400°C, unfilled polymer at 380°C and polymer containing filler with organic surface at 285°C). This proves the occurrence of interaction between the components. The hardness of the polymer filled with active filler is greater than that of the unfilled polymer (in the vitreous state) i.e. 24.3 kg/mm² for unfilled polymer; 26.9 kg/mm² in the case of 20% octadecylammonium-bentonite filled polymer and 28.5 kg/mm² for polymer filled with bentonite containing 10% adsorbed methyl methacrylate. 10% chalk as inactive filler reduces the hardness to 23.5 kg/mm. The thermomechanical curves were taken in accordance with the method by V. A. Kargin and T. I. Sogolova (Ref. 9). The vitrification

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88725

Filled polymers. IV. Combination of...

S/190/61/003/001/005/020
B119/B216

temperature of polymethyl methacrylate filled with active filler is increased insignificantly as compared to unfilled polymer, whereas the flow temperature is raised by about 50°C (230°C for unfilled, 280°C and 270°C, respectively, for actively filled and 205°C for chalk-filled polymer). The publication by P. A. Rebinder and collaborators (Ref. 8) is mentioned. There are 2 figures and 9 references: 8 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko
(Kiev State University imeni T. G. Shevchenko)

SUBMITTED: May 26, 1960

Card 3/3

S/153/61/004/003/005/008
E073/E535

AUTHORS: Uskov, I.A. and Chuyko, A.A.

TITLE: Bentonite sheet electrical insulation materials

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy SSSR.
Khimiya i khimicheskaya tekhnologiya, Vol. 4, No. 3,
1961, pp. 458-462

TEXT: E. A. Hauser and D. S. Le-Blau (Ref.1: J.Phys.Chem.
42, 961, 1031 (1938); Colloid. Chemistry, 6, 1961 (1946);
E. A. Hauser. USA Patent 2 531 247; 2 531 812 (1950)) proposed
producing sheet electrical insulation material from montmorillonite
clay. However, they gave very little information on the methods
of producing this material. Earlier work of the authors and their
team deals with obtaining bentonite films from high-dispersion
sodium bentonite on a cellophane base. The produced films had
good electrical insulation properties but the method of production
was complex and expensive. In this paper information is given on
a new, more convenient, method of producing bentonite electrical
insulation films and means of improving their hydrophobic and
mechanical properties are described. The material was produced

Card 1/5

Bentonite sheet electrical . . .

S/153/61/004/003/005/008
EO73/E535

from Pyzha bentonite which mainly consists of calcium montmorillonite. It swells relatively little in water and in its original form it is not suitable for producing coherent films. The bentonite was soaked in distilled water for 24 hours, homogenized and passed through a sieve with 4900 holes per cm². Onto the precipitate a 1N solution of sodium chloride was poured in a weight ratio of 20:1 (the weight ratio refers to dry bentonite). After settling, the transparent liquid was decanted and a fresh solution of sodium chloride was poured onto it. This operation was repeated until traces of calcium could be detected in the decanted liquid. After washing off the electrolyte residues with distilled water, the bentonite commenced to peptize and the top layer of the suspension was syphoned off. The residue was then passed through a super-centrifuge and a paste containing 33% of high dispersion sodium bentonite was obtained. The best results were achieved by using suspensions with concentrations of the order of 2 to 4%. As a sub-layer only aluminium proved satisfactory, which was covered with a thin layer of the glue 6Y-2 (BF-2) and heated for 4-6 hours at 120 to 140°C. These films were then dried

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Bentonite sheet electrical ...

S/153/61/004/003/005/008
E073/E535

(40 to 60°C proved satisfactory) and after drying they could be easily separated from the layer, yielding 30 to 50 μ thick films. In order to make the films hydrophobic, they were then treated with a solution of diethyl paraphenylenediaminosulphate and some of the specimens were additionally treated with dimethylchlorsilane vapours. Following that, the films were heat treated for one hour at 100 to 400°C. With increasing heat treatment temperature, the strength of the films increased but their elasticity decreased. The breakdown voltage, kV, of the produced films as a function of the heat treatment temperature, °C, is plotted in Fig. 2 (curve 1 - film treated solely with diethyl paraphenylenediaminosulphate; curve 2 - film additionally treated with dimethylchlorsilane vapours). It can be seen that heat treatment temperatures over 200°C improved the breakdown voltage very considerably. Films additionally treated with dimethylchlorsilane vapours were strongly hydrophobic and oil-repellent and their electrical strength was higher than films treated only with diethyl paraphenylenediaminosulphate. For increasing the mechanical strength reinforcement with glass fabric was tried. This was

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Bentonite sheet electrical ... *

S/153/61/004/003/005/008
E073/E535

successful only if the glass fabric was preliminarily wetted with a 1% solution of gelatine. Thus, the obtained insulation material will be useful for applications at temperatures up to 250-300°C and, if the material is not subjected to high bending deformations, the operating temperature can be increased to 350 to 400°C. There are 2 figures and 6 references: 5 Soviet and 1 non-Soviet. The English-language reference is quoted in the text.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im T.G.Shevchenko
Kafedra fizicheskoy i kolloidnoy khimii (Kiyev State
University imeni T.G.Shevchenko Department of Physics
and Colloidal Chemistry)

SUBMITTED: May 25, 1959

Card 4/5

USKOV, I.A.; USKOVA, Ye.T.

Electrochemical study of bentonite suspensions. Part 6:
Potentiometric titration of aminobentonite complexes
[with summary in English]. Koll.zhur 23 no.4:469-476 Jl-Ag
'61. (MIRA 14:8)

1. Kiyevskiy universitet im. T.G. Shevchenko i Kiyevskiy
tekhnologicheskiy institut pishchevoy promyshlennosti.
(Bentonite) (Potentiometric analysis)

158080 also 1581

32352
S/190/62/004/001/014/020
B110/B101

AUTHORS: Uskov, I. A., Kusnitsyna, T. A., Kozlova, T. P., Solomko,
V. P.

TITLE: Filled polymers. V. Introduction of aminated bentonite in
polycaprolactam

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 1, 1962, 95 - 97

TEXT: The authors studied the effect of highly disperse filler with modified surface (methyl-octadecyl-ammonium bentonite) (I) upon the physico-mechanical properties of crystalline polycaprolactam. I was obtained according to I. A. Uskov (Vysokomolek. soyed., 2, 200, 1960). For producing a highly disperse powder of I, the benzene-containing or aqueous paste was dried by sublimation. Xerogel obtained in this way can be easily dispersed to a powder. In a 70% methanolic caprolactam solution, bentonite showed optimum dispersion. Methanol was removed by drying at 60°C. Polycondensation proceeded in evacuated ampuls or in a CO₂ stream in the presence of 3% AΓ(AG) salt and 5% adipic acid during 8 hr at 265°C.

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X

3352
S/190/62/004/001/014/020
B110/B101

Filled polymers. V. Introduction ...

Mixing of the aqueous bentonite paste with caprolactam yielded a homogeneous, filled polymer. In the present case, polycondensation of a mixture of filler and caprolactam separated from the methanolic, monomeric solution took place. Tabular samples were cut from cylindrical blocks and the monomer was washed out by 10-hr boiling in water. The following molecular weights were viscosimetrically determined from solutions in 4% H₂SO₄:

Degree of bentonite amination in microequivalents per g	0	500	800	1000
Molecular weight of poly- caprolactam, in thousands	21.4±1.4	21.4±3.5	24.8±1.6	30.8±6

The degree of polymerization of polycaprolactam is not reduced by introducing fillers. A small increase is caused by neutralizing adipic acid acting as stabilizer by binding with amine adsorbed on bentonite. The

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S/190/62/004/001/014/020
B110/B101

Filled polymers. V. Introduction ...

thermomechanical curves for pure and filled polycaprolactam completely coincided. This is in agreement with V. A. Kargin's and T. I. Sogolova's data (Ref. 6: Vysokomolek. soyed., 2, 1093, 1960). Dependence of hardness of polycaprolactam on the content of I having a degree of amination of 800 microequivalents/gram is:

Filler content, %	0	1	3	5	8
Hardness, kg/mm ²	14.1	15.4	15.8	18.7	19.1

For the first 5%, the maximum increase in hardness caused by the active filler can be observed. Comparison between differently aminated I showed for 10% filler content:

Degree of amination, microequivalents/gram	500	800	1000
Hardness, kg/mm ²	17.0	16.0	16.8

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Filled polymers. V. Introduction ...

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S/190/62/004/001/014/020
B110/B101

O. D. Kurilenko and R. V. Mikhalyuk (Ref. 7: *Kolloidn. zh.*, 21, 195, 1959) found that low and high amination of bentonite led to a rise in heat of wetting with water. For maximum filler activity, not a completely hydrophobic but a somewhat polar surface is required. Aminated bentonite is an active filler of amorphous and crystalline polymers. There are 1 figure, 1 table, and 7 references: 5 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: I. W. Iordan, F. F. Maleyev, *J. Polymer Sci.*, 31, 301, 1958; A. J. Jurzhenko, *J. Phys. Colloid. Sci.*, 53, 294, 1949. X

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko
(Kiev State University imeni T. G. Shevchenko)

SUBMITTED: February 2, 1961

Card 4/4

SOLOMKO, V.P., kand. khimich. nauk, dotsent; USKOV, I.A., kand. khimich. nauk, dotsent; ZHIGOTSKIY, A.G., inzh.; NIZHNIK, V.V., inzh.

Studying the reaction of fibrous materials with polymer binders.
Izv. vys. ucheb. zav.; tekh. leg. prom. no.3:23-29 '63.

(MIRA 16:7)

1. Kiyevskiy Ordena Lenina gosudarstvennyy universitet imeni Shevchenko. Rekomendovana kafedroy fizicheskoy i kolloidnoy khimi.

(Polymers) (Textile fibers, Synthetic)
(Fillers)

USKOV, I.A. [Uskov, I.O.]; SOLONKO, V.P.; KUSNITSYNA, T.A. [Kusnitsyna, T.O.];
PELISHENKO, S.S.

Reinforcement of capron fiber by means of modified bentonite.
Dop. AN URSR no.6-798-201'63
(MIRA 1787)

1. Kiyevskiy gosudarstvennyy universitet. Predstavлено академиком
AN UkrSSR F.D. Ovcharenko.

L dcl04-55 SPP(c) 2117/1973 2nd 8/77 PC-4 Pr-4 Fe-4 RPL RM/WB

ACCESSION NR: AP4047199 8/0190/64/006/010/1768/1772

AUTHOR: Uskov, I. A.; Tarasenko, Yu. G.; Solomko, V. P.

TITLE: Effect of the degree of dispersion of clay fillers on the properties of amorphous polymers

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 6, no. 10, 1964, 1768-1772

TOPIC TAGS: filler particle size, clay filler, amorphous polymer, filled amorphous polymer, polymer strength, glass temperature, yield point, polymethylmethacrylate, polystyrene

ABSTRACT: The effect of active and inert clay fillers (kaolin & bentonite) of varying particle size on the glass temperature and mechanical properties of amorphous polymers (polymethylmethacrylate & polystyrene) was investigated. The results illustrated in Fig. 1 of the Enclosure show that a decrease in the particle size of active fillers increases the hardness and glass temperature, and also decreases somewhat the impact toughness and static bending strength of the polymer. An increase in size of inert fillers produces a considerable decrease in durability and thermal characteristics of the polymers. To obtain strong, filled, amorphous polymers, a strong interaction between the surface of

Card 1/4

L 26104-65

ACCESSION NR: AP4047189

the fillers and the polymeric medium and a high degree of dispersion must be obtained.
"S. O. Mel'nikova took part in the experimental work." Orig. art. has: 2 graphs and
5 photomicrographs.

ASSOCIATION: Klyeavskiy gosudarstvennyy universitet im. T. G. Shevchenko (Kiev
State University)

SUBMITTED: 22Nov63

ENCL: 02

SUB CODE: MT GC

NO REF SGT

L 26104-65
ACCESSION NR: AP 4047199

ENCL 01

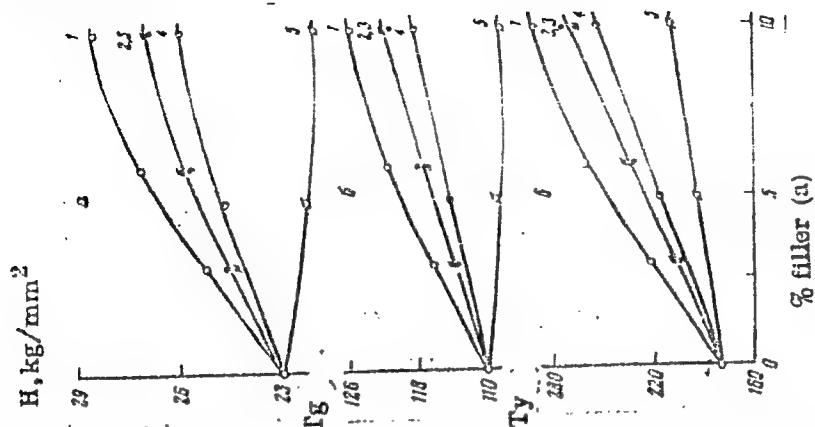


Fig. 1 - Effect of filler content on: A) the hardness (a), glass temperature (b) and yield point (c) of polymethylmethacrylate; B) the impact toughness (a) and static bending strength (b) of polymethylmethacrylate (solid lines) and polystyrene (dotted lines). 1-kaolin, 8 μ ; 2-kaolin, 35 μ ; 3- Na bentonite, 35 μ ; 4- bentonite aminated to 440 $\mu\text{eq/g}$, 7.5 μ ; 5- bentonite aminated to 200 $\mu\text{eq/g}$, 30 μ .

Card 3/4

L 26104-65

ACCESSION NR: AP4047199

ENCL: 02

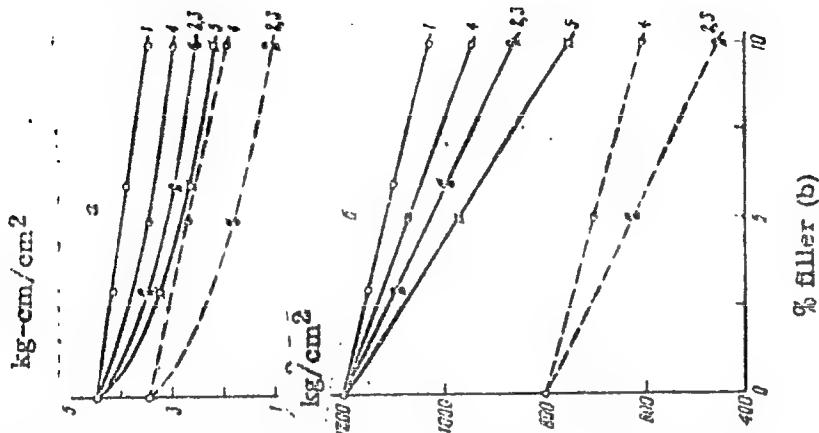


Fig. 1 - Effect of filler content on: A) the hardness (a), glass temperature (b) and yield point (c) of polymethylmethacrylate; B) the impact toughness (a) and static bending strength (b) of polymethylmethacrylate (solid lines) and polystyrene (dotted lines). 1-kaolin, 8 μ; 2-kaolin, 5 μ; 3- Na bentonite, 35 μ; 4- bentonite aminated to 440 meq/g, 7.5 μ; 5- bentonite aminated to 200 meq/g, 35 μ.

Caro 4/4

L 20493-65 EWP(j)/ENT(m) PC-4 AFETR/ESDT RM
ACCESSION NR: AP5001486 S/0190/64/006/012/2201/2201

AUTHOR: Solomko, V. P.; Uskov, I. A.; Molokoyedova, T. A.;
Pleshchenko, S. S.

TITLE: Effect of filler on morphological forms and properties of
polycaprolactam

SOURCE: Vysomolekulyarnyye soyedineniya, v. 6, no. 12, 1964, 2201

TOPIC TAGS: polycaprolactam, Nylon, filler, morphology, kaolin,
mechanical property

ABSTRACT: A laboratory study has been made of the effect of kaolin
filler (0.5—20%) on morphological forms in and properties of poly-
caprolactam under various conditions of heat treatment and filler ad-
dition. Polycaprolactam was used in the form of block specimens and
fibers. Heat treatment was carried out in the 180—280°C range in 20°C
increments. It was found that the kaolin changed the morphology of
polycaprolactam: spherulites decreased in size and the filler con-
centrated in interspherulitic boundaries. As a result, an improve-
ment in certain physical and mechanical properties was observed.

Card 1/2

TAPASENKO, Yu.G.; USKOV, I.A.; SOLOMKO, V.P.

Effect of kaolin on the properties of polymethyl methacrylate
and polystyrene. Ukr. khim. zhur. '90 no.1:86-90 '64.

(MIRA 17:6)

I. Kiyevskiy gosudarstvennyy universitet imeni Shevchenko.

ACCESSION NR: AP4022112

S/0073/64/030/003/0305/0308

AUTHOR: Solomko, V. P.; Poletukha, V. V.; Uskov, I. A.; Zhigotskiy, A. G.

TITLE: Interaction of polymers with fibrous fillers

SOURCE: Ukrainskiy khimicheskiy zhurnal, v. 30, no. 3, 1964, 305-308

TOPIC TAGS: filled polymer, fiberglass filler, polystyrene, polymethylmethacrylate, filled polystyrene, filled polymethylmethacrylate, softening temperature, fiberglass polymer compatibility, fiberglass polymerophilicity, silicone treated fiberglass

ABSTRACT: The effect of fiberglass filler concentration of the softening temperature of polystyrene (PS) and polymethylmethacrylate (PMMA) of different molecular weights (PS-80,000, PMMA-720,000) was investigated. Introduction of fiberglass (7 microns diameter, 3 microns long delubricated at 450C for 3 hours) into the polymer films significantly raised their softening temperatures, even at low filler concentrations: the effect being greater in PMMA than in PS (compare

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ACCESSION NR: AP4022112

figs. 1 and 2). This is attributed to the greater similarity in polarity and the possibility of hydrogen bond formation between the PMMA and the fiberglass. The addition of fiberglass treated with organosilicon compounds to PS film causes a more significant increase in its softening temperature (by 8-10C) in comparison with PS film filled with untreated glass. This is attributed to increasing the polymerophilicity of the fiberglass and its compatibility with polymers. Orig. art. has: 2 figures

ASSOCIATION: Kievskiy gosudarstvenny*y universitet im. T. G. Shevchenko
(Kiev State University)

SUBMITTED: 09Feb63

DATE ACQ: 09Apr64

ENCL: 02

SUB CODE: MT

NO REF SOV: 000

OTHER: 000

Card 2/4

L 21193-66 EWT(m)/EWP(j)/T/ETC(m)-6 WW/GS/RM
ACC NR: AT6006248 (A) SOURCE CODE: UR/0000/65/000/000/0077/0084

AUTHOR: Solomko, V. P.; Uskov, I. A.

56
1541

ORG: Kiev State University (Kiev's'kiy gosudarstvennyy universitet)

TITLE: Thermomechanical investigation of filled polymers

SOURCE: AN UkrSSR. Modifikatsiya svoystv polimerov i polimernykh materialov (Modification of the properties of polymers and polymeric materials). Kiev, Naukova dumka, 1965, 77-84

TOPIC TAGS: polymer, solid mechanical property, synthetic material, polymer, textolite, polymer structure, fiber glass, relaxation process

ABSTRACT: The effect of a concentration of glass powder and fiber glass fillers on vitrification, softening, and flow temperatures of polymethylmethacrylate, poly-styrene, polyvinylbutylaldehyde, polyvinylacetate, polyvinylalcohol, and polyethylene was investigated. The measurements were made using sheets of these polymers filled with 0-60 wt % of glass powder and fiber glass. The fiber glass filler threads were 3 mm in length and the glass powder was smaller than 360 mesh. The in-

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2

L 21193-66

ACC NR: AT6006248

fluence of the filler on surface hardness, structure, and relaxation properties of a polymer is reflected in the vitrification temperature. The degree of intimate interaction between the filler and the polymer affects primarily the deformation characteristics of the polymer-filler system and it is reflected in the softening temperature of the system. Softening temperature (in °C) of a polymer sheet as a function of filler concentration is shown in table 1. The temperatures (in °C) corresponding to 1% deformation of sheets of polyethylene with various concentrations of fillers are also given. Orig. art. has: 2 tables.

Card 2/3 *[Signature]*

L 21193-66
 ACC NR: AT6006248

TABLE 1 **sheets prepared by pressing

System	Filler concentration, wt %									
	0	2.5	5	10	20	30	40	50	60	
PS + FG	74	86	94	108	123	-	-	-	-	
PS + GP*	74	-	73	74	77	-	-	-	-	
PMMA + FG	65	73	84	123	137	-	-	-	-	
PMMA + GP*	65	65	64	65	64	-	63	-	-	
PMMA + GP**	65	65	64	65	64	-	63	-	-	
PVBA + FG	70	-	71	70	72	71	73	72	-	
PVBA + GP*	57	70	77	90	105	-	-	-	-	
PVA + FG	57	-	57	58	58	-	75	-	-	
PVA + GP*	32	47	56	70	73	-	-	-	88	
PVAL + FG	32	-	32	33	32	-	42	-	-	
PVAL + GP*	93	102	113	124	154	-	-	-	47	
PE + FG	71	70	71	71	71	71	-	-	-	
PE + GP*	71	70	71	71	71	-	70	-	71	

*sheets prepared from a solution
 ORIG REF: 017/ OTH REF: 001

SUB CODE: LL/
 Card 373 da

SUBM DATE: 06Oct65/

L 21823-66 EWP(j)/EWT(m)/ETC(m)-6/T IJP(c) RM/NW/GS
ACC NR: AT6006251 SOURCE CODE: UR/0000/65/000/000/0100/0109

AUTHOR: Solomko, V. P.; Zhigotskiy, A. G.; Uskov, I. A.

ORG: Kiev State University (Kievskiy gosudarstvennyy universitet)

TITLE: Mechanical properties of filled plasticized polymer sheets

SOURCE: AN UkrSSR. Modifikatsiya svoystv polimerov i polimernykh materialov (Modification of the properties of polymers and polymeric materials). Kiev, Naukova dumka, 1965, 100-109

TOPIC TAGS: solid mechanical property, polymer, synthetic material, glass textile, structural plastic

ABSTRACT: The effect of the concentration of fiber glass and dibutylphthalate filters on breaking stress σ_p , elongation ϵ_p , and initial modulus of elongation E of polystyrene and polymethacrylate sheets was examined at 3 and 30 mm/min stretching rates. Sheets of polystyrene ($8 \cdot 10^4$ mol wt) and polymethylmethacrylate ($7.2 \cdot 10^5$ mol wt) containing 0, 0.5, 1, 2.5, 5, 10, 15 and 20 wt % of alkali-free fiber glass

48
B+1

Z

Card 1/2

L 21823-66

ACC NR: AT6006251

O
(8 microns in diameter and 3 mm in length) and, also, sheets of polystyrene with polymethylmethacrylate containing 0, 0.5, 1, 2.5, 5, 10, 15 and 20 wt % of fiber glass and 5 and 20 wt % of dibutylphthalate plasticizer were used. The polystyrene and polymethylmethacrylate sheets were prepared by precipitation with methyl alcohol from their toluene solutions. The changes in σ_p , elongation ϵ_p , and initial modulus of elongation E for polystyrene are graphed. Orig. art. has: 4 figures, 2 tables.

SUB CODE: 11/ SUBM DATE: 060ct65/ ORIG REF: 010/ OTH REF: 000

Card 2/2 nst

L 14606-66 EWT(m)/T/EWP(j) RM
ACC NR: AP6001504 (A)

SOURCE CODE: UR/0191/65/000/012/0060/0062

AUTHORS: Pelishenko, S. S.; Unkov, I. A.; Solomko, V. P.

ORG: none

TITLE: Change of mechanical properties and water-resistance of polycaprolactam with introduction of dispersion fillers

SOURCE: Plasticheskiye massy, no. 12, 1965, 60-62

TOPIC TAGS: caprone, water, tensile strength, hardness, filler, kaolin

ABSTRACT: Preparation of filled polycaprolactams (I) with improved mechanical and water-resistant properties is described. Dry filler, (kaolin, mountain cork, or perlite) was mixed with caprolactam containing initiator and molecular weight stabilizer (adipic acid), and was polymerized in open ampules under a stream of inert gas. Smaller amounts of filler (< 8%) were added as aq. suspensions to heated (270°C), partially polymerized caprolactam, thus assuring uniform distribution of the filler. Test samples were prepared by forming I under pressure at 260--270°C as plates 10 x 15 x 3-mm or dumbbells 50 mm long and 10 x 3 across. Hardness, tensile strength, bending strength, specific impact toughness and water absorption were the properties measured. It was established that all fillers increased the hardness and lowered the tensile strength of I as can be seen in Fig. 1. Specific impact toughness remained unchanged with the content of kaolin up to 8%; then it dropped sharply.

UDC: 678.01.53:675.126

Card 1/2

L 114606-66

ACC NR: AP6001504

0

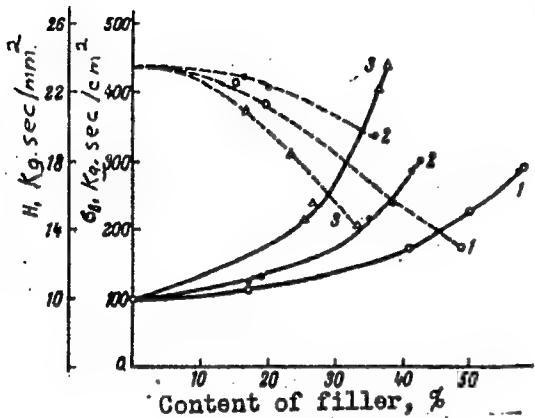


Fig. 1. Hardness H (—) and tensile strength σ_B (—) of filled polycaprolactam as functions of filler content:
 1 - kaolin; 2 - perlite;
 3 - mountain cork.

Bending strength dropped rapidly, even with small additions of filler. All fillers increased water-resisting properties of I. Orig. art. has: 4 figures, 1 table, and 3 equations.

SUB CODE: 07/ SUBM DATE: none/ ORIG REF: 003/ OTH REF: 001

Card 2/2

REF ID: A65165
SPP=165/010/002/0211/0213

ACCESSION #: APPROVAL

DATE: 03/14/2001
SOURCES: Ukravins'kyi fizichnyi universytet, Kyiv, Ukraine

MATERIAL: polymer
measurement with fiber-glass

SOURCE: Ukravins'kyi fizichnyi universytet, Kyiv, Ukraine

TOPIC TAGS: polymer, polystyrene, polymethylmethacrylate, polyethylene, strength measurement, fiberglass reinforcement

(Ukr. khim. in. v. 1990, v. 1)

Card 1/2

ACCESSION NR: AP6005916

The rupture machine used in the tests was also described earlier (Ukr. fiz. zhurn., 1978, v. 2, no. 1, p. 11-12). The main difference is that the samples were tested at a temperature of 100°C.

It is also suggested that the reinforcement of polyethylene films with fiberglass is due both to the uniform distribution of the stresses over the entire section of the sample and to the fact that the fibers are able to withstand a large number of cyclic loadings.

ASSOCIATION: Kiyivskyy derzhuniversytet im. T. G. Shevchenka
(Kiev State University)

SUBMITTED: ... day, 19... SUP. CODE: MI, 1

NR REF Sov: 020 OTHER: 002

Card 2/2

L 64992-65 ENG (b)/EPP (c)/ESP (d)/T/STC (e) SH/RM

ACCESSION NR: AP5013478

UR/0185/65/010/005/0549/0557

AUTHOR: Solomko, V. P.; Zhyhots'kyy, O. H. (Zhigotskiy, A. G.); Uskov, I. O. (Uskov, I. A.); Kuchynka, M. Yu. (Kuchinka, M. Yu.)

TITLE: Mechanical properties of filled polymers. II. Effect of deformation rate on the mechanical properties of fiberglass-filled polystyrene, polymethylmethacrylate and polyethylene

SOURCE: Ukrayins'kyy fizichnyy zhurnal, v. 10, no. 5, 1965, 549-557

TOPIC TAGS: material deformation, solid mechanical property, polymer, ^{44.55}polystyrene, polymethylmethacrylate, polyethylene, fiberglass, filler

ABSTRACT: The initial modulus of elongation, rupture stresses and elongation were studied as a function of filler concentration at various rates of deformation (0.3, 3 and 30 mm/min) in fiberglass-filled polystyrene, polymethylmethacrylate and polyethylene. In contrast to the case of pure polymers, a reduction in the stretching rate increases the rupture stress of filled polystyrene and polymethylmethacrylate below the glass transition temperature, and reduces the rupture stress of polyethylene above the glass transition temperature. A reduction in the stretching rate

Card 1/2

L 64952-65

ACCESSION NR: AP5013478

3

increases the initial modulus of elongation for all three systems. The effect of the deformation rate on the mechanical properties of fiberglass-filled polystyrene, polymethylmethacrylate and polyethylene films is explained (based on the relaxation character of deformation in the filled polymers) by the structure of the filler and the redistribution of stresses through the cross section of the specimen. Crig. art. has: 6 figures, 3 tables.

ASSOCIATION: Kyiv's'kyy derzhuniversytet im. T. H. Shevchenka (Kiev State University)

SUBMITTED: 28Sep64

ENCL: 00

SUB CODE: MT, AS

NO REF SOV: 010

HER: 001

Card 2/2

L 4925-66 EWP(e)/EWP(m)/EPF(c)/EWP(1)/EMP(j)/T RPL WW/RM/WH

ACC NR: AP5026581

SOURCE CODE: UR/0073/65/031/010/1071/1073

AUTHOR: Uskov, I. A.; Solomko, V. P.; Chemeris, N. P.

ORG: Kiev State University im. T. G. Shevchenko (Kiyevskiy gosudarstvennyy universitet)

TITLE: Dispersive acceleration of radical polymerization

SOURCE: Ukrainskiy khimicheskiy zhurnal, v. 31, no. 10, 1965, 1071-1073

TOPIC TAGS: radical polymerization, vibration effect, polymethyl methacrylate, hydrogen bonding

ABSTRACT: The dispersive acceleration of radical polymerization of vinyl monomers was studied during the vibration milling of montmorillonite. Cause of the acceleration is a facilitation of the radical decomposition of the adsorbed initiator under the influence of the impact loads. A rise in temperature decreases the effectiveness of the phenomenon as a result of a decreased adsorption of the initiator (benzoyl peroxide) and an acceleration of its decomposition in the homogeneous phase. When montmorillonite is dispersed in a medium of vinyl monomers, no chemical grafting of the polymer to the solid surface takes place. Polymethyl methacrylate, not extractable with boiling benzene, forms as a result of the binding of its macromolecules to the hydroxyl-containing surface of montmorillonite by hydrogen-bond forces. A lowering of temperature promotes the formation of bound polymethyl methacrylate, since under these conditions a larger amount of polymer is formed in the immediate vicinity of the solid surface. Orig. art. has: 3 figures and 1 table.

SUB CODE: GC / SUBM DATE: 29May65 / ORIG REF: 004 / OTH REF: 003

Card 1/1

UDC 541.64

0701 1389

USKOV, I.A.; TERTYKH, L.I.; SOLOMKO, V.P.; POLISHCHUK, Yu.N.

Radiation-induced polymerization of methyl methacrylate and
styrene in the presence of mineral fillers. Vysokom. soed. 8
no. 1-26-30 Ja '66 (MIRA 19:1)

1. Kiyevskiy gosudarst~~vnyy~~ universitet imeni Shevchenko 1.
Inst.tut fizicheskoy ~~khimi~~ AN UkrSSR. Submitted February 5,
1965.

PL 26116-66 6/21/81 (01) R10136/L64/P4 L1JF161 . KVM/RCW
ACC NR: AP6003420 SOURCE CODE: UR/0190/66/008/0..L/0104/CLOS

AUTHOR: Solomko, V. P.; Molokoyedova, T. A.; Uskov, I. A.

ORG: Kiev State University im. T. G. Shevchenko (Kiyevskiy gosudarstvennyy universitet)

TITLE: Effect of fillers on the morphological forms and mechanical properties of crystalline polymers

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 1, 1966, 104-108 and insert facing page 104

TOPIC TAGS: crystalline polymer, solid mechanical property, filler, polymerization, spherulite, bending strength

ABSTRACT: A study directed toward improving the mechanical properties of crystalline polymers by means of fillers has been carried out at Kiev State University. Polycaprolactam and two fillers, kaolinite and glass fiber, were used in the experiment. The effect of the fillers on the morphological forms and mechanical properties of the polymers was studied with specimens which contained varying amounts of fillers. The specimens, 5--6 mm thick and 10 mm in diameter, were prepared as follows: 1) compression molding at 180°C and 1000 kg/cm²; 2) heating to 270°C followed by cooling at a rate of 2--3°C/min to 270--180°C; 3) heat treatment at this temperature for 1 hr; and 4) cooling to room temperature at the same rate. It was found that specimens prepared by mixing finely divided polycaprolactam molding powder with 5 to 20% kaolinite turned out to consist of alternating kaolinite and polycaprolactam spherulite layers, and to be very brittle. To improve the structure and the mechanical properties of the filled

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UDC: 678.01:53

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ACC NR: AP6003420

polymer, it was found necessary to lower the filler content, and to improve the distribution of the filler while retaining its original finely divided state in the polymer. To this end the fillers were added to the polymer in the course of polymerization. Kaolinite or glass fiber (3 mm long) in the form of an aqueous suspension was added drop-wise to caprolactam polymerizing under an inert gas at 270°C, 35 min after the onset of the polymerization. As the drops hit the melt, they explode under the effect of the steam formed and cause the filler to distribute uniformly in the melt.

The effect of filler content and heat-treatment temperature on spherulite size in the improved polycaprolactam specimens was determined (See Fig. 1) using metallographic techniques. Micrographs of filled and nonfilled specimens heat-treated at 260°C showed that the filler concentrates in the boundaries and defect spots of spherulites.

The decrease in the spherulite size which occurs on addition of kaolinite (see Fig. 1) can be explained as follows: 1) kaolinite acts as a nucleating agent which accelerates crystallization, and 2) some of the filler is squeezed out into the less dense, amorphous interspherulite regions, concentrates within these regions, and hinders spherulite growth.

The effect of glass fiber on spherulite size requires further study, presently in progress.

Card 2/4

26116-66
ACC NR: AP6003420

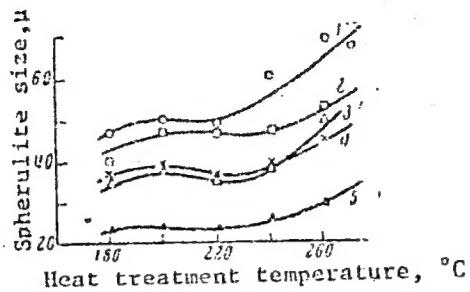


Fig. 1. Effect of heat treatment temperature on the size of spherulites of filled and non-filled polycaprolactam (PC)

1 - Nonfilled PC; 2 - PC, filled with 0.5% kaolinite; 3 - PC, filled with 5% kaolinite; 4 - PC, filled with 0.5% glass fiber; 5 - PC, filled with 5% glass fiber.

Structural changes in filled polycaprolactam were shown to correlate with changes in its mechanical properties, e.g., the highest bending strength was exhibited by specimens filled with 2% kaolinite. Improvement of the mechanical properties of polycaprolactam by fillers can be attributed to two factors: 1) decrease of the spherulite size, and 2) strengthening of the amorphous interspherulite regions.

Card 3/4

L 26116-65

ACC NR: AP6003420

This strengthening is very important in view of the established facts that polymers crystallize stepwise, and that the final steps, which involve slow crystallization of the amorphous regions, can last up to several years and cause changes in the properties of the polymer (aging). Concentration of filler particles in amorphous regions lowers molecular mobility, hinders molecular rearrangement to form the crystalline phase, and promotes stabilization of the original polymer structure.

Stabilization of the most favorable structures in the polymers could greatly contribute to an improvement of the mechanical properties of the end products. Preliminary studies by the authors of changes in the microstructure and crystallinity of filled and unfilled polycaprolactam as a function of time suggested the feasibility of stabilizing the structures of crystalline polymers by means of fillers. Further studies along these lines are in progress. Orig. art. has: 2 figures. [FG3: v.2, no.3]

SUB CODE: 11, 20, 07 / SUBM DATE: 17Feb65 / ORIG REF: 009 / OTH REF: 005

Card 4/4 C.C.

L 18023-66 EWP(e)/EWT(m)/EWP(j)/T/ETC(m)-6 WW/RM/WH
ACC NR: AP6006989 (A) SOURCE CODE: UR/0190/66/008/002/0363/0363

AUTHOR: Uskov, I. A.; Pelishenko, S. S.; Solomko, V. P.; Borovikova, S. M. 39
B

ORG: none

TITLE: Chemical grafting of polycaproamide to glass fiber 5144.55

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 2, 1966, 363

TOPIC TAGS: nylon, graft copolymer, glass reinforced plastic

ABSTRACT: A study has been made of the graft polymerization of polycaprolactam to glass fiber. It is noted that glass fiber-reinforced polycaprolactams, which have received widespread application, are usually prepared by introducing the fiber into the polymer melt. Introduction of the fiber into the polymerizing system was of great interest since a stronger fiber-binder interaction is thereby rendered possible. Chopped alkali-free glass fiber, 11 μ in diameter, nonlubricated or finished with AGM or chromolan coupling agent, was used. The resultant reinforced plastic had improved mechanical properties and lesser swelling in water and hence better service properties. Extraction proved that a considerable portion of the polycaprolactam is in fact grafted to the fiber. 7 [SM]

SUB CODE: 11, 07/ SUBM DATE: 07Sep65/ ATD PRESS: 4212

Card 1/1 vmb

UDC: 541.64+678.675